

general and about the genetic relations of the generic groups in particular that all preceding and any present effort to classify them into families and groups of higher rank can be nothing better than a provisional arrangement. The paramount need of the present is to work out the facts.

PALEONTOLOGY.—*Trachelocrinus*, a new genus of Upper Cambrian crinoids.¹ E. O. ULRICH, U. S. Geological Survey.

Cambrian crinoids at all well preserved are extremely rare and desirable. They are particularly needed in these days when prevailing classifications are in course of modification along lines in which the genesis of the animals is being given greater consideration than heretofore.

The specimen that is the subject of this communication was collected by Dr. C. E. Resser and Mr. Robert Bassler from the upper part of the Gallatin limestone just above Hayden Falls, Republic Creek, a mile south of Cooke City, Montana. The particular bed in which the specimen was found is correlated with the "crinoid zone" of the Franconia formation in the upper Mississippi Valley where it lies between the top of the Ironton sandstone member and, as in the Montana section of the Gallatin, just under the widely distributed *Eoorthis* zone.

Though an unquestionable crinoid, it is exceedingly difficult to find a satisfactory resting place for this unique Cambrian fossil in any of the several classifications now in common use. It can hardly be referred to the Eocrinoidea: the stem is too well developed and the arms have a type of branching or pinnulation and a plate-covered ambulacral furrow, neither of which conditions is known to occur in that subclass. This crinoid is definitely of a higher order. Probably Jaekel's subclass Cladocrinoidea includes its nearest relatives, and it may be viewed as an early stage in the evolution of those crinoids. But none of the numerous cladocrinoid genera and families adopted or instituted by Jaekel can justly include our new crinoid. It must stand for the present as the type of both a new genus and a new family which we may provisionally place in the Order Dicyclica. This opinion is expressed despite the fact that considerable resemblance, at least in general aspect and structure, is notable on comparison with a large but as yet unpublished group of cystids that we have found in the Chazy rocks of east Tennessee.

¹ Received January 3, 1929. Published by permission of the Director of the U. S. Geological Survey.

The arms are five in number, long and moderately stout, the brachioles arranged in a double series, each somewhat longer than wide, the fourth and eighth, and then each succeeding third or fourth on the left side of the arm, bearing a short biserial armlet approximately half as wide as the main arm. In the two arms that exhibit their bases the first brachial on the right side gives off a short armlet like those on

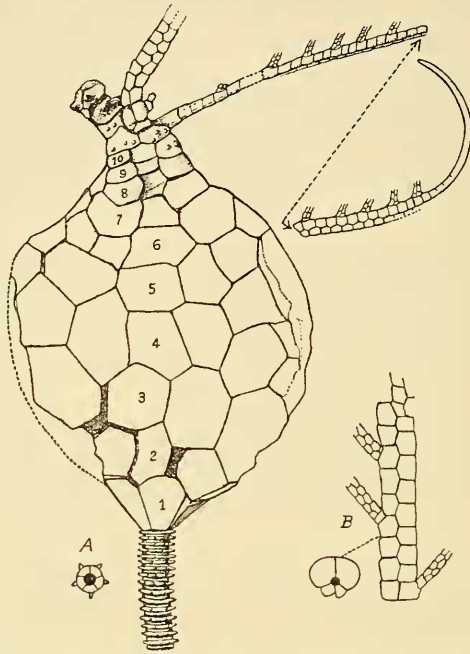


Figure 1.—Outline drawing, $\times 1.7$, of the left side of the nearly entire but crushed specimen upon which the new genus and species *Trachelocrinus resseri* are based. The outline of the calyx, as it lies on the bedding plane of the slab of shaly limestone, is approximately normal, but the form and arrangement of the plates, the ranges of which are numbered 1 to 10 in the figure, was more or less disturbed under the weight of the sediments that reduced the opposite dimensions of the bottle-shaped calyx to less than one-fourth of its original diameter. Accordingly, most of the plates in the middle part of the drawing were originally wider. A, cross-section of column. B, lower part of arm showing its biserial character, the single pinnule or armlet on the right side, two of the armlets that occur on each succeeding third or rarely fourth brachiole of the left side, and a cross-section of the arm.

the left side of the arm. The ambulacral furrow on both the main arm and its short branches is narrow and covered with two alternating and relatively thick series of plates.

The column, of which about 2 inches is preserved, is round and in the proximal inch consists of alternating very thin and thicker 5-partite columnals, the sutures between them minutely crenulated on the surface. Each of the larger set carries, presumably, 5 spines.

The lumen is cylindrical and, excluding the outer spines, takes up about half of the diameter of the column. In the distal third of the

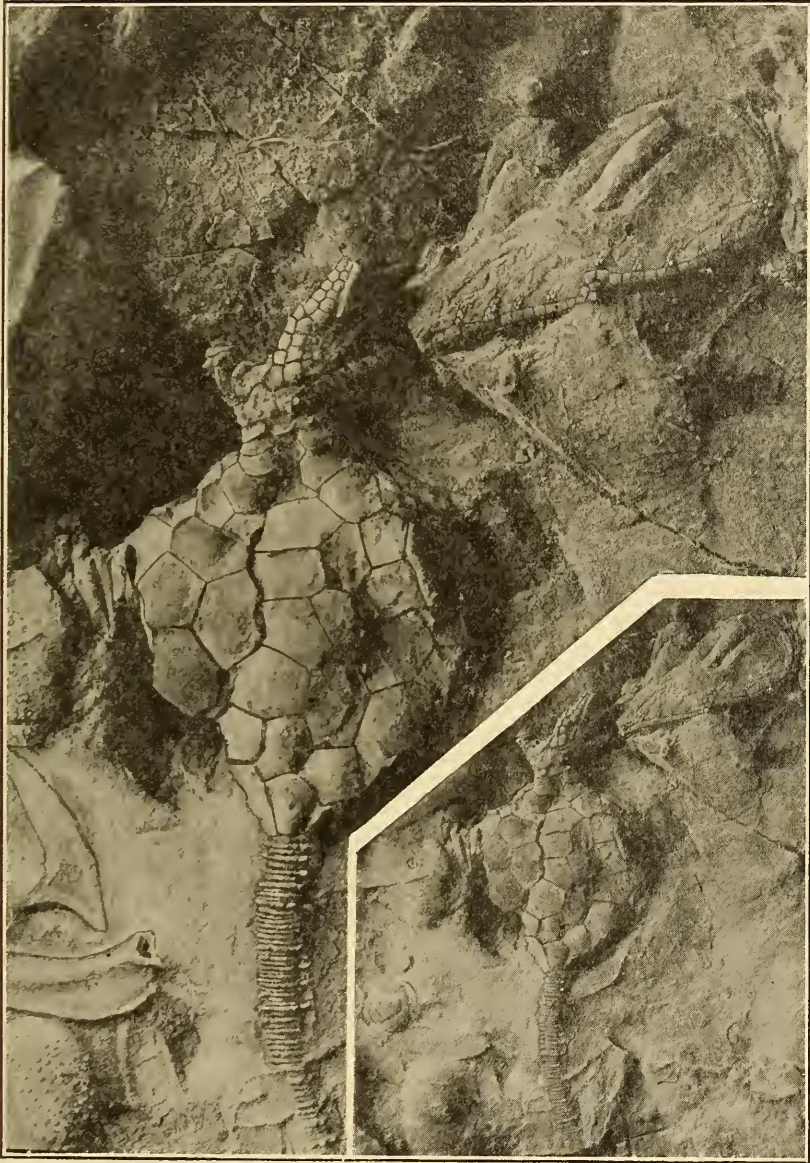


Figure 2.—*Trachelocrinus resseri* Ulrich, n. gen. and sp., nat. size and $\times 2$

2 inches of column preserved the two sets of columnals are nearly equal in thickness.

Trachelocrinus resseri Ulrich, n. gen. and sp.

An apparently normally long-stemmed pentamerid crinoid, with subovate, urn or bottle-shaped body contracted above to form a relatively narrow neck-like support for the long arms. Neck trilobed in cross-section. Calyx, with numerous plates, arranged in irregularly alternating transverse ranges, most of those in the middle ranges hexagonal, the basal range five in number and pentagonal; the second, six and mainly hexagonal; the third, fourth, and fifth ranges more or less irregularly hexagonal and varying in number from nine to eleven; the sixth range heptagonal and probably nine in number; the seventh range—making base of neck—small, ten in number, five of them pentagonal, five smaller and quadrangular; the eighth, ninth and tenth ranges also ten each, small, much wider than high, and arranged in longitudinal series with the plates of the seventh and sixth ranges; the tenth range only five in number, as low as those under them but twice as wide and with the sutures between them falling over the middle of each second plate of the preceding four ranges. Finally, the arms are set directly over the sutures of the terminal neck range.

The excess in number above five and the irregularities in shape of plates in the third, fourth, and fifth ranges, which span the most inflated part of the calyx, is due to the intercalation of similar plates that in such more normally plated crinoids as the Cladocrinoidea would be called interradians. Indeed, the right half of the side exposed in the specimen suggests a larger "inter-radial" area that would correspond to the anal interradius. That this suggested orientation may well be correct is further indicated by the fact that whereas four of the arm bases are close to each other the fifth, which should be the anterior, lies farther from its neighbors and directly opposite the supposed anal interradius.

Basals five, high, pentagonal; above them six alternating ranges of plates, all but those of the last two ranges somewhat irregularly hexagonal. In the sixth range, beginning with the basals, the plates are heptagonal, the middle of the upper edge of each being truncated to support one of the series of small quadrangular plates which separate the sides of the larger pentagonal plates that make up the greater part of the seventh range. So far as can be seen, each of the ten plates of the seventh range is succeeded by a series of three short plates (at least twice as wide as long). These are succeeded by the final range which consists apparently of but five plates that carry nodes and are not longer but wider than the preceding ten-plate ranges. Finally the biserial arms rest on the sutures of the five-plate range.

ARCHAEOLOGY.—*On the recent finding of another flint arrow-head in the Pleistocene deposit at Frederick, Oklahoma.*¹ CHARLES N. GOULD, Director, Oklahoma Geological Survey. (Communicated by O. P. Hay.)

The Frederick gravel bed in which, during the past two years, a number of bones of prehistoric animals and several human artifacts have been found, is located on a ridge a mile north of the town of Frederick, county seat of Tillman County, southwestern Oklahoma.

¹ Received January 3, 1929.